

CLAIM AMENDMENTS

This listing of claims will replace all prior versions and listings of claims in the application.

1. (Currently Amended) A method of monitoring and diagnosing resource utilization within a connection oriented network made of network elements, at least one of said network elements including a connection resource tracker for maintaining a database of resource utilization, comprising the steps of:

a.——specifying a plurality of resource types for the network elements of the network, each resource type being defined by a capacity limit and a utilization;

b.——providing a utilization threshold and a specified threshold for each specified type of resource, wherein the utilization threshold is set at a ~~high~~ threshold value used to determine whether resources are being over-utilized and the specified threshold is set at a ~~high-threshold~~ value used to determine whether resources used are exceeding a maximum allowable limit;

c.——measuring the utilization for all resources at the network elements;

d.——in response to a query from a user relating to a particular type of resource, comparing the utilization for all resources of the particular type as measured in ~~step c.~~ the measuring step with the utilization threshold for said particular type for determining whether the utilization of any resource of said particular type is above the corresponding utilization threshold;

e.——if the utilization is above the corresponding utilization threshold for at least one said resource, generating a report and identifying in the report each resource of the particular type for which the utilization is above the corresponding utilization threshold and presenting the report to an operator of said network; and

f.——if the utilization is above the corresponding specified threshold for at least one said resource, checking a timer associated with the ~~connection-resource;~~ tracker, and

when the timer has expired, generating an alarm for the resource and generating an alarm only if the timer has expired resetting the timer associated with the resource only when the alarm has been generated for the resource.

2. (Previously Presented) The method of claim 1 wherein the plurality of resource types includes at least one of bandwidth, line card capacity, number of connection end points per line card, Virtual Path Identifier numbers, Virtual Connection Identifier numbers, MultiProtocol Label Switching (MPLS) label numbers, memory within the switch, number of supportable leaf endpoints per system, number of supportable connections in a connecting state, number of MPSL state blocks, and number of connections in a database.

3. (Currently Amended) The method of claim 1 wherein the step d. of comparing the utilization for all resources is carried out only with respect to resources within a list of resources.

4. (Original) The method of claim 3 wherein the step of providing at least one utilization threshold comprises receiving at least one utilization threshold from an operator.

5. (Canceled)

6. (Currently Amended) The method of claim 1 wherein the step e. of generating the report comprises receiving at least one utilization threshold from an operator.

7. (Currently Amended) The method of claim 1 wherein the step e. of generating the report further comprises including the utilization of any identified resources in the report.

8. (Currently Amended) The method of claim 7, ~~further comprising step a.~~
~~including: wherein:~~

the step of specifying the plurality of resource types further comprises
providing a list of resources, the list of resources including at least one of
bandwidth, line card capacity, number of connection end points per line card,
Virtual Path Identifier numbers, Virtual Connection Identifier numbers,
MultiProtocol Label Switching (MPLS) label numbers, memory within the switch,
number of supportable leaf endpoints per system, number of supportable
connections in a connecting state, number of MPLS state blocks, and number of
connections in a ~~database;~~ database.

~~wherein the step e.~~ the step of generating the report is carried out only with
respect to resources within the list of resources, and

~~wherein the step of providing at least one utilization threshold comprises~~
receiving at least one utilization threshold from an operator.

9. (Currently Amended) The method of claim 1, further comprising the steps of:

~~g.~~—upon identification of a resource for which the utilization is above the
specified threshold, generating an alarm identifying the resource; and

~~h.~~—presenting the alarm to an operator.

10. (Previously Presented) The method of claim 1 wherein the step of providing at
least one utilization threshold comprises receiving at least one utilization threshold
from an operator.

11. (Previously Presented) The method of claim 1 wherein the step of determining
whether a utilization of a resource is above the corresponding utilization threshold
and the step of identifying each such resource are carried out repeatedly.

12. (Previously Presented) The method of claim 1 further comprising a step of

pausing after the step of identifying each resource for which the utilization is above the corresponding utilization threshold.

13. (Currently Amended) The method of claim 1, further comprising ~~the further~~ step of:

i. ~~monitoring for receipt of call connection establishment signals; signals,~~
and wherein the step of determining whether a utilization of a resource is above the corresponding utilization threshold and the step of identifying each such resource are carried out only upon receipt of a call connection establishment signal.

14. (Currently Amended) The method of claim 13, further comprising ~~the further~~ step of:

j. ~~determining whether an alarm has been generated since the utilization of the resource last rose above the specified threshold; threshold,~~

and wherein the step of generating an alarm is carried out only if an alarm has not been generated since the utilization of the resource last rose above the specified threshold.

15. (Original) The method of claim 14 wherein the step of generating a report further comprises including the utilization of any identified resources in the report.

16. (Currently Amended) The method of claim 15, ~~further wherein step a. includes:~~

the step of specifying the plurality of resource types further comprises providing a list of resources, the list of resources including at least one of bandwidth, line card capacity, number of connection end points per line card, Virtual Path Identifier numbers, Virtual Connection Identifier numbers, MultiProtocol Label Switching (MPLS) label numbers, memory within the switch, number of supportable leaf endpoints per system, number of supportable connections in a connecting state, number of MPLS state blocks, and number of connections in a database; ~~and,~~

~~wherein~~ the step of determining whether a utilization of a resource is above the corresponding utilization threshold is carried out only with respect to resources within the list of resources, and

~~wherein~~ the step of providing at least one utilization threshold comprises receiving at least one utilization threshold from an operator.

17. (Currently Amended) A processor for monitoring resource utilization within a connection oriented switch made of network elements, at least one of said network elements including a connection resource tracker for maintaining a database of resource utilization, comprising:

a.—instructions for specifying a plurality of resource types for the network elements of the network, each resource type being defined by a capacity limit and a utilization;

~~b.~~—instructions for providing a utilization threshold and a specified threshold for each specified type of resource, wherein the utilization threshold is set at a high-threshold value used to determine whether resources are being over-utilized and the specified threshold is set at a high-threshold value used to determine whether resources used are exceeding a maximum allowable limit;

e.—instructions for measuring the utilization for all resources at the network elements;

~~d.~~—instructions for, in response to a query from a user relating to a particular type of resource in said database, comparing the measured utilization for all resources of the particular type ~~as measured in step e.~~ with the utilization threshold for said particular type for determining whether the utilization of any resource of said particular type is above the corresponding utilization threshold;

e.—instructions for, if the utilization is above the corresponding utilization threshold for at least one said resource, generating a report and identifying in the report each resource of the particular type for which the utilization is above the corresponding utilization threshold and presenting the report to an operator of said network; and

f.——instructions for, if the utilization is above the corresponding specified threshold for at least one said resource, checking a timer associated with the ~~connection-resource; tracker,~~

instructions for, when the timer associated with the resource has expired,
generating an alarm for the resource and ~~generating an alarm only if the timer has~~
~~expired~~ resetting the timer associated with the resource only when the alarm has
been generated for the resource.

18. (Currently Amended) The processor of claim 17 wherein the plurality of resources includes at least one of bandwidth, line card capacity, number of connection end points per line card, Virtual Path Identifier numbers, Virtual Connection Identifier numbers, MultiProtocol Label Switching (MPLS) label numbers, memory within the switch, number of supportable leaf endpoints per system, number of supportable connections in a connecting state, number of MPLS state blocks, and number of connections in a database.

19. (Original) The processor of claim 17 further comprising instructions for providing a list of resources, and wherein the instructions for determining whether a utilization of a resource is above the corresponding utilization threshold make this determination only with respect to resources within the list of resources.

20. (Original) The processor of claim 19 wherein the instructions for providing at least one utilization threshold comprise instructions for receiving at least one utilization threshold from an operator.

21. (Canceled)

22. (Previously Presented) The processor of claim 17 wherein the instructions for providing at least one utilization threshold comprise instructions for receiving at least one utilization threshold from an operator.

23. (Previously Presented) The processor of claim 17 wherein the instructions for generating the report further comprise instructions for including the utilization of any identified resources in the report.

24. (Currently Amended) The processor of claim 23 further comprising:

a.——instructions for providing a list of resources, the list of resources including at least one of bandwidth, line card capacity, number of connection end points per line card, Virtual Path Identifier numbers, Virtual Connection Identifier numbers, MultiProtocol Label Switching (MPLS) label numbers, memory within the switch, number of supportable leaf endpoints per system, number of supportable connections in a connecting state, number of MPLS state blocks, and number of connections in a ~~database~~; database.

wherein the instructions for determining whether a utilization of a resource is above the corresponding utilization threshold are executed only with respect to resources within the list of resources, and

wherein the instructions for providing at least one utilization threshold comprise instructions for receiving at least one utilization threshold from an operator.

25. (Currently Amended) The processor of claim 17 further comprising:

a.——instructions for, upon identification of a resource for which the utilization is above the specified threshold, generating an alarm identifying the resource; and

b.——instructions for presenting the alarm to an operator.

26. (Original) The processor of claim 25 wherein the instructions for providing at least one utilization threshold comprise instructions for receiving at least one utilization threshold from an operator.

27. (Original) The processor of claim 25 further comprising instructions for executing the instructions for determining whether a utilization of a resource is above the corresponding utilization threshold and the instructions for identifying each such resource repeatedly.

28. (Original) The processor of claim 27 further comprising instructions for pausing after the instructions for identifying each resource for which the utilization is above the corresponding utilization threshold are executed.

29. (Currently Amended) The processor of claim 25 further comprising:

a.—instructions for monitoring for receipt of call connection establishment signals; and

b.—instructions for executing the instructions for determining whether a utilization of a resource is above the corresponding utilization threshold and the instructions for identifying each such resource upon receipt of a call connection establishment signal.

30. (Currently Amended) The processor of claim 29 further comprising:

a.—instructions for determining whether an alarm has been generated since the utilization of the resource last rose above the corresponding specified threshold; and

instructions for executing the instructions for generating an alarm only in the event that an alarm has not been generated since the utilization of the resource last rose above the corresponding specified threshold.

31. (Original) The processor of claim 30 wherein the instructions for generating a report further comprise instructions for including the utilization of any identified resources in the report.

32. (Currently Amended) The processor of claim 31 further comprising:

a.—instructions for providing a list of resources, the list of resources including at least one of bandwidth, line card capacity, number of connection end points per line card, Virtual Path Identifier numbers, Virtual Connection Identifier numbers, MultiProtocol Label Switching (MPLS) label numbers, memory within the switch, number of supportable leaf endpoints per system, number of supportable connections in a connecting state, number of MPLS state blocks, and number of connections in a database;

wherein the instructions for determining whether a utilization of a resource is above the corresponding utilization threshold are executed only with respect to resources within the list of resources, and wherein the instructions for providing at least one utilization threshold comprise instructions for receiving at least one utilization threshold from an operator.

33. (Currently Amended) A computer-readable medium comprising instructions for monitoring resource utilization within a connection oriented network made of network connections, at least one of said network elements including a connection resource tracker for maintaining a database of resource utilization, comprising:

a.—instructions for specifying a plurality of resource types for the network elements of the network, each resource type being defined by a capacity limit and a utilization;

b.—instructions for providing a utilization threshold and a specified threshold for each specified type of resource, wherein the utilization threshold is set at a high-threshold value used to determine whether resources are being over-utilized and the specified threshold is set at a high-threshold value used to determine whether resources used are exceeding a maximum allowable limit;

e.—instructions for measuring the utilization for all resources at a network element;

d.—instructions for, in response to a query from a user relating to a particular type of resource in said database, comparing the measured utilization for

all resources of the particular type ~~as measured in step e.~~ with the utilization threshold for said particular type for determining whether the utilization of any resource of said particular type is above the corresponding utilization threshold;

e.—instructions for, if the utilization is above the corresponding utilization threshold for at least one said resource, generating a report and identifying in the report each resource of the particular type for which the utilization is above the corresponding utilization threshold and presenting the report to an operator of said network; and

f.—instructions for, if the utilization is above the corresponding specified threshold for at least one said resource, checking a timer associated with the ~~connection resource; tracker; and~~

instructions for, when the timer has expired, generating an alarm for the resource and generating an alarm only if the timer has expired resetting the timer associated with the resource only when the alarm has been generated for the resource.

34. (Currently Amended) A method of monitoring resource utilization within a connection oriented network made of network elements, at least one of said network element including a connection resource tracker for maintaining a database of resource utilization, comprising the steps of:

a.—specifying a plurality of resource types for the network elements of the network, each resource type being defined by a capacity limit and a utilization;

b.—providing a utilization threshold and a specified threshold for each specified type of resource, wherein the utilization threshold is set at a high threshold value used to determine whether resources are being over-utilized and the specified threshold is set at a high threshold value used to determine whether resources used are exceeding a maximum allowable limit;

e.—measuring the utilization threshold for all resources at a network element;

d.—in response to a query from a user relating to a particular type of resource in said database, comparing the utilization for all resources of the particular type as measured in ~~step e.~~ the measuring step with the utilization threshold for said particular type for determining whether the utilization of any resource of said particular type is above the corresponding utilization threshold;

e.—if the utilization is above the corresponding utilization threshold for at least one said resource, generating a report and identifying in the report each resource of the particular type for which the utilization is above the corresponding utilization threshold and presenting the report to an operator of said network; and

f.—if the utilization is above the corresponding specified threshold for at least one said resource, checking whether a flag associated with the resource indicates that an alarm has recently been generated for the resource and, if the flag does not indicate that the alarm has recently been generated, generating an alarm and setting a flag to indicate that an alarm has recently been generated.

35. (Canceled)

36. (Previously Presented) The method of claim 34 wherein the step of providing at least one utilization threshold comprises receiving at least one utilization threshold from an operator.

37. (Original) The method of claim 36 further comprising the step of providing a list of resources, and wherein the step of determining whether a utilization of a resource is below the corresponding utilization threshold is carried out only with respect to resources within the list of resources.

38. (Previously Presented) The method of claim 37 wherein the step of generating the report further comprises including the utilization of any identified resources in the report.

39. (Currently Amended) A processor for monitoring resource utilization within a connection oriented network made of network elements, at least one of said network elements including a connection resource tracker for maintaining a database of resource utilization, comprising:

a.—instructions for specifying a plurality of resource types for the network elements of the network, each resource type being defined by a capacity limit and a utilization;

b.—instructions for providing a utilization threshold and a specified threshold for each specified type of resource, wherein the utilization threshold is set at a highthreshold value to determine whether resources are being over-utilized and the specified threshold is set at a highthreshold value used to determine whether resources used are exceeding a maximum allowable limit;

c.—instructions for measuring the utilization for all resources at the network element;

d.—instructions for, in response to a query from a user relating to a particular type of resource in said database, comparing the measured utilization for all resources of the particular type ~~as measured in step c.~~ with the utilization threshold for said particular type for determining whether the utilization of any resource of said particular type is above the corresponding utilization threshold;

e.—instructions for, if the utilization is above the corresponding utilization threshold for at least one said resource, generating a report and identifying in the report each resource of the particular type for which the utilization is above the corresponding utilization threshold and presenting the report to an operator of said network; and

f.—instructions for, if the utilization is above the corresponding specified threshold for at least one said resource, checking whether a flag associated with the resource indicates that an alarm has recently been generated for the resource, and if the flag does not indicate that the alarm has recently been generated, generating an alarm and setting a flag to indicate that an alarm has recently been generated.

40. (Canceled)

41. (Previously Presented) The processor of claim 39 wherein the instructions for providing at least one utilization threshold comprise instructions for receiving at least one utilization threshold from an operator.

42. (Original) The processor of claim 41 further comprising instructions for providing a list of resources, and wherein the instructions for determining whether a utilization of a resource is below the corresponding utilization threshold are executed only with respect to resources within the list of resources.

43. (Previously Presented) The processor of claim 42 wherein the instructions for generating the report further comprise instructions for including the utilization of any identified resources in the report.

44. (Currently Amended) A computer-readable medium comprising instructions for monitoring resource utilization within a connection oriented network made of network elements, at least one of said network elements including a connection resource tracker for maintaining a database of resource utilization, comprising:

a.—instructions for specifying a plurality of resource types for the network elements of the network, each resource type being defined by a capacity limit and a utilization;

b.—instructions for providing a utilization threshold and a specified threshold for each specified type of resource, wherein the utilization threshold is set at a highthreshold value used to determine whether resources are being over-utilized and the specified threshold is set at a highthreshold value used to determine whether resources used are exceeding a maximum allowable limit;

e.—instructions for measuring the utilization for all resources at the network element;

d.—instructions for, in response to a query from a user relating to a particular type of resource in said database, comparing the measured utilization for all resources of the particular type ~~as measured in step e.~~ with the utilization threshold for said particular type for determining whether the utilization of any resource of said particular type is above the corresponding utilization threshold;

e.—instructions for, if the utilization is above the corresponding utilization threshold for at least one said resource, generating a report and identifying in the report each resource of the particular type for which the utilization is above the corresponding utilization threshold and presenting the report to an operator of said network; and

f.—instructions for, if the utilization is above the corresponding specified threshold for at least one said resource, checking whether a flag associated with the resource indicates that an alarm has recently been generated for the resource and if the flag does not indicate that the alarm has recently been generated, generating an alarm and setting a flag to indicate that an alarm has recently been generated.

45. (Currently Amended) A method of monitoring and diagnosing resource utilization within a connection oriented network made of network elements, at least one of said network elements including a connection resource tracker for maintaining a database of resource utilization, comprising the stops of:

a.—specifying a plurality of resource types for the network elements of the network, each resource type being defined by a capacity limit and a utilization;

b.—providing a utilization threshold and a specified threshold for each specified type of resource, wherein the utilization threshold is set at a ~~low~~-threshold value used to determine whether resources are being under-utilized and the specified threshold is set at a ~~low~~-threshold value used to determine whether resources used are below a minimum allowable limit;

e.—measuring the utilization for all resources at a network elements;

d.—in response to a query from a user relating to a particular type of resource, comparing the utilization for all resources of the particular type as

measured in ~~step e.~~ the measuring step with the utilization threshold for said particular type for determining whether the utilization of any resource of said particular type is below the corresponding utilization threshold;

e.——if the utilization is below the corresponding utilization threshold for at least one said resource, generating a report and identifying in the report each resource of the particular type for which the utilization is below the corresponding utilization threshold and presenting the report to an operator of said network; and

f.——if the utilization is below the corresponding specified threshold for at least one said resource, checking a timer associated with the resource ~~tracker, and generating an alarm if the timer has expired; and~~

when the timer has expired, generating an alarm for the resource and generating an alarm only if the timer has expired resetting the timer associated with the resource only when the alarm has been generated for the resource.

46. (Currently Amended) A method of monitoring resource utilization within a connection oriented network made of network elements, at least one of said network element including a connection resource tracker for maintaining a database of resource utilization, comprising the steps of:

a.——specifying a plurality of resource types for the network elements of the network, each resource type being defined by a capacity limit and a utilization;

b.——providing a utilization threshold and a specified threshold for each specified type of resource, wherein the utilization threshold is set at a ~~low~~threshold value used to determine whether resources are being under-utilized and the specified threshold is set at a ~~low~~threshold value used to determine whether resources used are below a minimum allowable limit;

e.——measuring the utilization threshold for all resources at a network element;

d.——in response to a query from a user relating to a particular type of resource in said database, comparing the utilization for all resources of the particular type as measured in ~~step e.~~ the measuring step with the utilization

threshold for said particular type for determining whether the utilization of any resource of said particular type is below the corresponding utilization threshold;

e.——if the utilization is below the corresponding utilization threshold for at least one said resource, generating a report and identifying in the report each resource of the particular type for which the utilization is below the corresponding utilization threshold and presenting the report to an operator of said network; and

f.——if the utilization is below the corresponding specified threshold for at least one said resource, checking whether a flag associated with the resource indicates that an alarm has recently been generated for the resource, and, if the flag does not indicate that the alarm has recently been set, generating an alarm and setting a flag to indicate that an alarm has recently been generated.